

Course Title: Compilers and Languages
Date: 29.11.2016 (First term)Course Code: CCE3113 3rd year
Allowed time: 1 hrsAnswer the following questions:Question No. 1

(10 marks- 2 marks for each)

1. How many distinct strings are in the language of the regular expression?
 $(0+1+\epsilon)(0+1+\epsilon)(0+1+\epsilon)(0+1+\epsilon)\dots\dots\dots$ Explain.

2. How many strings does the following grammar generate? Explain.

 $A \rightarrow BB$
 $B \rightarrow CC$
 $S \rightarrow 1 \mid 2$

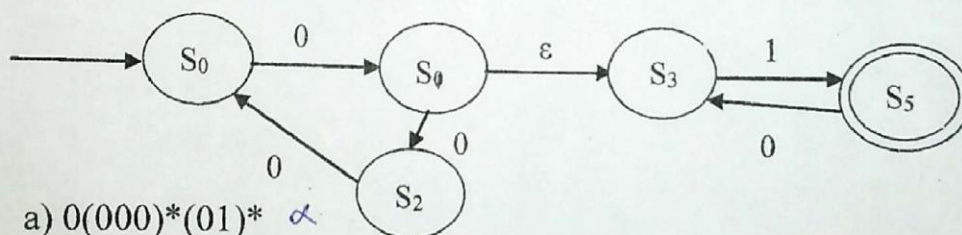
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3. Explain with an example why the grammar below is ambiguous.

 $S \rightarrow AaA \mid AbA$
 $A \rightarrow c \mid S$

4. What are the error recovery strategies generally used by parser?

5. Which of the following regular expressions generate the same language as the one recognized by this NFA? [Check all that apply]



- a) $0(000)^*(01)^*$ ☒
- b) $(000)^*(01)^+$ ☒
- c) $0(00)^*(10)^*$ ☒
- d) $0(000)^*1(01)^*$ ☒
- e) $(000)^*(10)^+$ ☒

Question No. 2

(10 marks)

1. Consider the grammar with the set of terminals: (8 marks)

 $S \rightarrow (L) \mid a \mid b$
 $L \rightarrow L, S \mid S$

(i) Remove left-recursion from the grammar

(ii) Find the First and Follow sets for each non-terminal of the modified grammar.

(iii) Write down a recursive descent parser (i.e. parsing algorithm) for the modified grammar.

(iv) Construct an LL(1) parse table for this grammar.

2. Left factor the following grammar: (2 marks)

 $A \rightarrow AabcA \mid Aad \mid AabA \mid Ad$

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Best wishes
Dr. Sherin El Gokhy

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